



**JAMESTOWN WILDLIFE AREA
BUFFALO CREEK PUMPING LINE**

Cloud County, Kansas

**CONSTRUCTION SPECIFICATIONS
July 2013**

**Technical Specifications
Prepared By:
SCHWAB-EATON, P.A.**

BUFFALO CREEK PUMPING LINE

Jamestown Wildlife Area
Cloud County, Kansas

Project Specifications:

Section 01010 – Summary of Work and General Requirements

Section I – Excavation and Trenching

Section II – Concrete

Section III – Plastic Pipe

SECTION 01010
SUMMARY OF WORK AND GENERAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Project Scope:** Contractor shall supply all equipment, materials, and labor necessary to construct marsh water supply pipeline at Jamestown Wildlife Area, Cloud County, KS.

1.2 DEFINITION

- A. Architect/Engineer:** Where the word "Architect/Engineer" is used throughout the Contract Documents, it shall be understood to mean KDWPT Engineering Services.

1.3 POINTS OF CONTACT

- A. Point of Contact (P.O.C.) Names:** The following individuals may be contacted regarding the Project. For technical and administrative questions concerning the Project during bidding and construction, contact:

Chad Grisier, P.E.
Project Engineer
KDWPT Engineering Services
785-296-3859

1.4 SITE VISITS

- A. Bidders Access to Site:** Bidders and sub-bidders may have access to the work site by contacting the Area Manager to arrange a day and time.

Rob Unruh
Public Lands Manager
Jamestown Wildlife Area
785-439-6243

1.5 AGREEMENTS FOR BIDDING:

- A.** Bidder acknowledges and agrees to submit his Bid in accordance with the provisions required by the Bid Form (State of Kansas Request for Quotation) supplied to the Bidder by Kansas Division of Purchases and to the following terms and conditions for bidding. Time and place for submittal of Bids is indicated on the Bid Form.
- B.** The Project shall be constructed under a single Contract and will be awarded to the responsible Bidder offering the lowest bid price and meeting the requirements for bidding

and requirements of the Contract Documents. The lowest bid price will be calculated by the sum of the Base Bid and the total of any Alternates that are accepted by Owner after all Bids are opened.

- C. Failure to acknowledge receipt of Addenda issued may be cause for Owner's rejection of a Bid.
- D. An incomplete Bid or information included but not solicited on the Bid Form may be cause for Owner's rejection of a bid.
- E. A Bid may be considered incomplete or non-responsive if it fails to quote a price for an Alternate or other separate item identified and solicited on the Bid Form supplied to the Bidder.
- F. The Kansas Division of Purchases reserves the right to reject any or all Bids and to waive technicalities and formalities for the acceptance or rejection of Bids, should such action be deemed in the best interest of the Owner.
- G. The Owner reserves the right to accept or reject any or all Alternates submitted with the Bid before award of the Contract.
- H. In compliance with K.S.A. 75-3741, subcontractors which the Contractor proposes to employ for the work shall be listed.
- I. It is the responsibility of the Contractor to supply his prospective subcontractors with copies of the Contract Documents for bidding. Neither the Owner nor the Kansas Division of Purchases will be responsible for supplying prospective subcontractors with Contract Documents for bidding.

1.6 ADDENDA

- A. **Acknowledgment of Receipt of Addenda:** I/we _____ have received and considered the following Addenda in the submitted Bid for this Project. (Bidder shall fill in signature above using same person as signing the Bid Form and shall initial each applicable Addenda space below.)

None (____) #1 (____) #2 (____) #3 (____) #4 (____) #5 (____)

- B. **Substantiation:** Bidder shall attach a copy of this completed page to the Bid Form.

1.7 TIME OF COMPLETION

- A. **Calendar Days:** Contractor agrees, if awarded the Contract, to complete the Work of the Contract within 60 **calendar days** from the date of the "Notice to Proceed" issued by the KDWPT Project Manager.

- B. Substantial Completion is defined as:** All products furnished, installed, and work completed in accordance with the contract documents with exception of deficient items noted on final inspection.

1.8 LIQUIDATED DAMAGES

- A. Amount:** Liquidated damages for the Project are established at the rate of **\$200** per day until completion of the project.

1.9 FEDERAL TAX

- A. Federal Tax Included:** Bidder acknowledges that the cost for the Federal Excise Tax has been included in quoted prices on the Bid Form, to cover the cost of said tax on all items of construction, equipment, and material subject to such tax.

1.10 STATE TAX

- A.** This project has been determined by the Kansas Department of Revenue to be subject to Kansas sales tax. The cost of said Tax must be INCLUDED IN all Bid and Contract prices. Sales tax includes all applicable state, county and city sales taxes.
- B.** A general contractor or other contractor who contracts directly with the State of Kansas or one of its agencies shall pay tax as follows:
1. Labor: No tax will be assessed since the labor is purchased directly by the State or one of its agencies.
 2. Materials: Taxes will be assessed on material purchased for the project.
- C.** A subcontractor on this project shall pay tax as follows:
1. Labor Taxes will be assessed because this labor is not purchased directly by the state or one of its agencies. (However, labor will not be taxed on projects calling for the original construction of a building or for repair or remodeling of a residence).
 2. Materials: Taxes will be assessed on materials purchased for the project.
- D.** Whether sales tax should be paid to the Department of Revenue by a subcontractor on the subcontractor's labor services will depend upon whether the project qualifies as the original construction of a building or facility or as the repair or remodeling of a residence. The contractor and each subcontractor will be responsible for determining whether labor services for the project qualifies for such exemption and for including the correct amount of state, county and city sales tax applicable to this project. Contractors and subcontractors must include all sales tax due on materials, which are not exempt on this project. Any

questions should be addressed to the Kansas Department of Revenue, Division of Taxation, Taxpayer Assistance Center. [\(785\) 296-0222](tel:785-296-0222).

- E. A general contractor or other contractor that contracts directly with the State of Kansas shall obtain copies of the Kansas Retailers Sales Tax Registration certificates from all its subcontractors on this project and have them available at the jobsite upon request.

1.11 PRE-CONSTRUCTION

- A. **Requirements:** Prior to starting construction the following items shall be completed.

1. Contractor's completion of a Pre-Construction Meeting with KDWPT personnel.
2. Receipt of "Purchase Order" from State of Kansas, Division of Purchases.
3. Receipt of "Notice to Proceed" issued from KDWPT.

1.12 SUBMITTAL

- A. **Addressing of Submittals:** Submittals, notifications, and reports required by the Specifications and Conditions of the Contract shall be sent and addressed to the following, unless otherwise indicated in the Contract Documents.

Chad Grisier, PE
KDWPT Engineering Services
1020 S Kansas Avenue, Suite 200
Topeka, KS 66612
Office: 785-296-3859
fax: 785-296-6953

- B. **Format and Identification:** Project number shall be on all submittals. Submittals shall be approved by the General Contractor prior to submittal to the engineer. All copies shall have an indication of General Contractor approval.
- C. **Marking and Legibility:** Submittals in the form of manufacturer's standard preprinted data and brochures shall be suitably marked by Contractor to designate the information, materials, and products applicable to the Project. Such markings shall be reproducible by means of standard photocopy machinery. Color highlighting as a means of marking is not acceptable.
- D. **Copies:** Contractor shall provide 2 copies of each submittal for Owner's records plus the number of copies needed by Contractor.
- E. **Processing Time:** Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal.

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
2. Resubmittal Review: Allow 15 days for review of each resubmittal.

1.12 GUARANTEES AND WARRANTIES

- A. **General:** Provide guaranties and warranties in accordance with the General Conditions of the Contract and as required by the Specifications.
- B. **Submittal:** Warranties and guarantees shall be addressed and submitted to:

Chad Grisier, PE
KDWPT Engineering Services
1020 S Kansas Avenue, Suite 200
Topeka, KS 66612
Office: 785-296-3859
fax: 785-296-6953

1.13 MATERIAL, EQUIPMENT, AND SUBSTITUTIONS

- A. **Materials and Products:** In general, the Contract Documents identify the required materials and equipment by naming one or more manufacturer's brand name, model number, catalog number, or other similar proprietary identification. Where one or more proprietary identifications or manufacturers is listed for a category of material and equipment, the intent is that the Contractor may provide any of those listed. Bids shall be based on Contractor providing only those materials and equipment named and identified in the Contract Documents.
- B. **Material Quality:** Contractor provided material and equipment shall be new, unused, and undamaged when delivered to the site.
- C. **Substitutions:** Materials and equipment not named in the Contract Documents which the Contractor wishes to provide will be considered as a substitution in accordance with the following procedures and conditions and may be provided only when approved by the Owner.
 1. Substitution Requests: When request for substitution is made after execution of the Contract, Contractor shall request substitution in writing and such request shall be accompanied by complete information to allow Owner's analysis including, manufacturer's and product identification, technical data including performance, dimensional and operational characteristics, cost data impact on time for completion, samples, and other information necessary for analysis. Include an itemized comparison of the qualities and characteristics of the specified item versus those of the substitution item. Submit 2 copies of request and

accompanying information and clearly identify as “Request for Substitution” followed by appropriate Project Number.

2. Conditions: Owner will consider substitutions only under one or more of the following conditions.
 - a. Required for compliance with subsequent interpretations of code requirements.
 - b. Unavailability of a specified item, through no fault of Contractor.
 - c. Subsequent information discloses inability of specified item to perform properly or fit in designated space.
 - d. Manufacturer of fabricator refuses to certify, guarantee, or warranty performance of specified item.
 - e. When the Owner determines that in his judgment a substitution would be substantially to the Owner’s best interest in terms of cost, time or other considerations.
3. Contractor’s Representations: By submitting a request for substitution, Contractor represents the following:
 - a. Proposed substitution has been personally investigated by Contractor.
 - b. The substitution material or equipment carries the same or better warranty or guarantee as the specified item.
 - c. Cost data presented is complete and includes all related costs under the Contract, and Contractor waives all claims for additional costs related to the substitution and the Project which subsequently become apparent.
 - d. Installation of an approved substitution shall be coordinated with all portions of the Work, and that changes as may be necessary shall be made so that the Work is complete in all respects.

1.14 TEMPORARY FACILITIES AND CONTROLS

- A. General:** Contractor shall provide temporary facilities and controls necessary to complete the Work. Remove Contractor provided temporary facilities and controls upon completion of the Work and sooner when no longer needed.
- B. Contractor’s Field Office and Storage:** Space for a field office within the work area is acceptable. An exterior area to accommodate a field office or material storage at the work site, if requested by Contractor, will be provided at a location to be designated by the

Owner. Owner is not responsible for safe keeping or protection of materials of equipment stored on Owner's property.

- C. Toilet Facilities:** as available.
- D. Water:** as available.
- E. Electric and Lighting:** as available.
- F. Telephone:** Not provided.

1.15 ADDITIONAL REQUIREMENTS

- A. Existing Facilities:** The Contractor shall take all necessary precautions to insure against damage to existing facilities and their contents. Any damaged items shall be repaired or replaced by the Contractor at no additional cost to the Owner.
- B. Protection of Work:** The Contractor shall take all necessary precautions to insure against damage to Products and Work. Any damaged items shall be replaced, or repaired, so as to eliminate evidence of repair, at no additional cost to the Owner.
- C. Project Maintenance:** Remove debris and rubbish from the work site as frequently as necessary to avoid safety hazards and unsightliness, and at the end of each workday.

1.16 INSPECTIONS

- A. Inspections:** Inspections will be conducted by KDWPT Engineering Services Section personnel and or the engineer or his designated representative as frequently as deemed necessary.
- B. Notifications:** The Contractor shall give KDWPT personnel at the Engineering Services Section office a minimum of 24 (twenty-four) hours notice prior to any concrete pours or concealment or covering for inspection purposes.
- C.** Inspections conducted by Engineering Services Section personnel does not relieve Contractor from compliance of Contract Documents.

END OF SECTION

BUFFALO CREEK
PUMPING LINE
TECHNICAL SPECIFICATIONS



SECTION I

EXCAVATION AND TRENCHING

I-1. GENERAL:

1. This section covers the excavation and embankment work required for the project and includes structure excavation, trenching, backfilling, all necessary sheeting, shoring and protection work, pumping and dewatering as necessary or required and other subsidiary or appurtenant work.

I-2. CLASSIFICATION OF EXCAVATED MATERIALS:

1. Materials excavated under this contract will not be classified and all excavation required for installing the water mains and appurtenances shall include the satisfactory removal and disposition of all materials excavated regardless of the nature of the material encountered.

I-3. TRENCH EXCAVATION:

1. Except as otherwise indicated on the drawings, trenches in soil for water mains and service lines shall provide a minimum depth of cover of 36-inches above the top of the pipe.
2. Where rock is encountered, trench depth may be reduced 6-inches. Soil that contains loose or soft rock which can be trenched by a wheel trencher or material not requiring special equipment is not, for this purpose, considered rock.
3. Greater depth trenching may be required at road crossings, railroad crossings, stream crossings, pipeline crossings and telephone cable crossings or at any other locations as may be called for on the plans.
4. The Contractor shall not open more trench in advance of pipe laying than is necessary to expedite the work.
5. All excavated materials shall be deposited on the side of trenches at such a distance so that no additional load due to surcharge is placed on the trench bank.
6. The trench bottom shall be uniformly graded and cleaned in such a manner that the pipe will be in continuous and uniform contact with the trench bottom for its entire length.
7. The bottom of the trench shall be free of rocks, clods or other sharp edged objects.

I-4. TRENCH WIDTHS:

1. The trench width shall be a minimum of one and one half times the nominal pipe diameter, or as indicated on the Plans, except in areas where rock is encountered.

BUFFALO CREEK PUMPING LINE

I-5. PIPE CLEARANCE IN ROCK:

1. Ledge rock, shale, boulders and large stones shall be removed to provide a minimum of six inches below the pipe and 6-inches at the either side.
2. These minimum clearance requirements are not minimum average but are minimum clear distances, which will be permitted between the pipe being laid and any projection or point of such rock, shale, stone or boulder.
3. All material so removed shall be replaced with sand or select material as required in trench backfill.

I-6. REPLACEMENT OF UNSTABLE PIPE FOUNDATIONS:

1. In locations where an otherwise stable soil becomes soft or mucky in the bottom of the trench as a result of construction operations and the presence of the ground or surface water and is in such a condition that the trench bottom cannot be properly shaped and graded and also where it is difficult and impractical to obtain a uniform bearing for the pipe at all points because of the hardness of the soil, such unsuitable material shall be removed to a depth of not less than 4-inches below the elevation of the pipe subgrade over the entire width of the trench and replaced with suitable, finely divided material of acceptable quality and sufficiently damp for proper compaction.

I-7. BLASTING:

1. Blasting, when required, including necessary and proper safety precautions shall be performed in compliance with all laws, ordinances and applicable safety code requirements and regulations relative to the handling, storage and use of explosive and the protection of life and property.
2. The Contractor shall be responsible for all damage to life and property caused by his blasting operations.
3. Suitable weighted plank covering or mattresses shall be provided to confine all materials lifted by blasting within the limits of the excavation or trench.
4. The Contractor shall be responsible for removing all rocks which may be brought to the ground surface by blasting or other means of excavation. Insofar as possible, the ground surface shall be returned to its original condition.

I-8. REMOVAL OF WATER:

1. The Contractor shall provide and maintain proper and adequate dewatering equipment for the removal and disposal of all surface and ground water and water from other sources entering excavations for the structure, trenches or other parts of the work.

BUFFALO CREEK PUMPING LINE

I-9. BRACING AND SHEETING:

1. All excavation and trenches shall be properly and substantially braced and sheeted where necessary to prevent caving and sliding and to provide adequate protection to the workmen.
2. If at any time during the progress of the work, bracing and sheeting as provided appear to the Engineer to be inadequate to insure the protection desired, he may order the Contractor to improve the bracing and/or sheeting used and the Contractor shall comply with such immediately.
3. Neither compliance with such orders nor the failure of the Engineer to issue such orders shall relieve the Contractor from his obligations to secure the degree of safety required by this contract.
4. The Contractor alone shall be responsible for the safety and adequacy of all bracing and sheeting methods used.

I-10. TRENCH BACKFILL:

1. In all locations where ledge rock, shale, boulders or large stones are encountered and at any other location directed by the Engineer, the trench shall be backfilled with dry sand or select material the full width of the trench from depth of six inches below the pipe to six inches above the pipe.
2. No rock greater than 3-inches in diameter shall be used for trench backfill within one foot of the pipe.
3. In all areas where rock excavation is necessary, the Owner's representative shall be present to approve the depth and type of bedding material and the first 12-inches of backfilling. Pipe laid in violation of this provision shall be removed and relayed at the Contractor's expense.
4. The entire backfill beneath the roadbed of existing roads (where open cut is allowed) and driveways shall be thoroughly compacted in 6-inch lifts by the use of hand or pneumatic tampers or by wheel rolling where practical. The Contractor will be required to continually monitor and maintain the trench backfill within road right-of-way to insure safe vehicular operating conditions. Any settlement noted shall be repaired immediately.
5. The lower portion of all trenches shall be filled around the pipe and to an elevation of at least 6-inches above the top of the pipe with sand or select backfill placed by hand unless otherwise approved by the Engineer.
6. Trenches not in the roadbed of existing roads or driveways may be backfilled 6-inches above the top of the pipe by any method or combination of methods, which will not impose concentrated or unbalanced loads on the installed pipe.

BUFFALO CREEK PUMPING LINE

7. Trench backfill for pipe used for service lines shall be the same as specified in the above paragraphs.

I-11. STRUCTURE EXCAVATION:

1. Excavation for structures shall be carried only to the lines and depths as shown on the drawings. Care shall be taken not to excavate deeper than is required and the bottom of all structures shall rest on solid, undisturbed foundations.
2. Excavations shall be kept dry and no work shall rest on or in mud or mucky soil or in water and shall be sufficiently stable to remain firm and intact under the feet of the workmen.
3. Subgrades for structures shall be firm and dense and if necessary, shall be reinforced and stabilized by the addition of coarse gravel or crushed stone.

I-12. UNAUTHORIZED EXCAVATION:

1. The bottom surfaces of all concrete foundations and fittings shall be in direct contact with original, undisturbed subgrade material. Any material excavated below the specified subgrade in each case shall be replaced by and at the expense of the Contractor with concrete of the same quality and at the same time as structure concrete is placed.
2. The Contractor shall replace with concrete at his own expense all materials excavated beneath the specified subgrade of any concrete floor or other slab designed to be supported directly on undisturbed subsoil material.
3. In placing such concrete, all loose excavated materials shall be removed and concrete shall be deposited directly upon solid, undisturbed material.

I-13. STRUCTURE BACKFILL:

1. Backfilling around the outside of structure or vertical pipe shall be compacted to prevent future settlement.
2. All such backfill shall be made of earth only and shall be compacted by methods acceptable to the Engineer.
3. No wood, broken concrete, trash or debris of any kind shall be placed in the backfill.
4. All backfill material compacted by hand tamping or mechanical means shall be placed in layers of 6-inches in depth.

I-14. DISPOSAL OF SURPLUS MATERIAL:

1. All excavated material of any kind not required for backfilling of trenches or other excavation shall be disposed of by the Contractor at locations approved by the Owner.

SECTION II

CONCRETE

II-1. GENERAL:

1. This section covers the furnishing of all materials and equipment and performing all labor for the manufacture, forming, transporting, placing, finishing and curing of concrete in the structures included in these specifications.

II-2. COMPOSITION:

1. Concrete used for the work shall be composed of portland cement, fine and coarse aggregate and water.
2. Portland cement shall be an approved brand and quality and shall be Type I cement. Certified mill reports shall be furnished to show compliance with the specifications of the cement furnished.
3. Aggregate shall comply with the current Kansas State Highway Commission Standard Specifications for Highways and Bridges, Section 1102(b) Mixed Aggregate, Type MA-1.
4. Water shall be suitable for domestic use and shall be from an approved source.
5. Admixtures shall not be used except with special permission and under strict methods of control.

II-3. PROPORTIONING:

1. The proportions of the concrete mix shall be submitted to the Engineer for approval before the work starts.
2. The mix shall be so designed as to produce a concrete of such consistency and distribution of aggregate that it can be properly placed and finished by accepted and approved mechanical and/or hand methods without segregation and with proper flow around reinforcement.
3. The mix shall be designed by the water-cement ratio with the following limits:

	<u>Sacks of Cement Per Cubic Yard of Concrete, Minimum</u>	<u>*Gallons of Water Per Sack of Cement, Maximum</u>
Aggregate possessing less than 30% (by weight) on No. 4 sieve	6.4	6.25
Aggregate possessing 30% or more (by weight) on No. 4 sieve	6.0	6.25

*Gallons of water per sack of cement includes water in aggregate.

BUFFALO CREEK PUMPING LINE

4. Standard 4"x8" or 6"x12" cylinders made, stored and tested under laboratory conditions shall develop a crushing strength of not less than 2500 psi in 7 days and not less than 4000 psi in 28 days. This part of the specifications shall take precedence over other requirements to the extent that more cement shall be used if necessary to insure specified strengths.
5. To determine compliance with this specification, three standard cylinders shall be made from the first concrete poured and shall be tested at the expense of the Contractor by a testing laboratory approved by the Engineer as follows: two cylinders shall be tested at 7 days, the third shall be tested at 28 days. Thereafter, three test cylinders shall be made for each 20 yards of concrete poured or fraction thereof poured any one day and shall be tested at 28 days at the expense of the Contractor. Certified test reports shall be furnished to Owner.
6. Within the above limitations the proportions may be varied to produce the desired qualities of workability, absence of segregation and water drain and proper flow around reinforcement. All concrete shall be mixed not less than 1½ minutes in a batch-type mixer and shall be deposited in the forms and compacted in place before initial set begins and while it is still plastic. At the Contractor's option ready-mix concrete may be used provided all other requirements are complied with.
7. The use of retempered concrete will not be permitted.

II-4. FORMS:

1. Forms shall be accurately constructed with smooth linings.
2. Forms for the exposed interior surfaces of walls shall have linings of smooth plywood, tempered pressed wood or of steel.
3. All forms shall be rigidly braced and fully tied to resist all pressures or loads without observable deflection.
4. Forms shall be thoroughly cleaned and oiled prior to the placing of the reinforcement steel and depositing concrete.
5. Forms shall not be removed until the concrete is hard enough to support all loads without damage.

II-5. REINFORCING STEEL:

1. Reinforcing bars shall be of the deformed type and shall be billet or rail steel complying with ASTM specification either A15 or A16 and the deformation to A305.
2. Certified copies of mill tests indicating conformance to the governing specifications shall be submitted to the Engineer with (and covering) each shipment of reinforcing steel.
3. Reinforcing steel shall be bent as shown and in accordance with Standard Bending Details of the American Concrete Institute.

BUFFALO CREEK PUMPING LINE

4. The spacing of bars shall be as shown on the drawings or as directed.
5. The minimum cover for all main reinforcement shall conform to the dimensions shown on the drawings. The dimensions shown indicate the clear distance from the edge of the main reinforcement to the concrete surface.
6. All splices in reinforcing steel shall be lapped as shown or as directed.
7. Bars shall be maintained accurately in position while placing and compacting concrete.

II-6. DEPOSITING CONCRETE:

1. Concrete shall be placed in the forms in a way which will prevent segregation. It shall not be allowed to have a fall of more than five feet unless through a closed pipe which not only prevents segregation but will also prevent splattering of the forms with mortar.
2. All concrete shall be compacted in place by the use of internal vibrators in conjunction with hand spading when deemed necessary by the Engineer.
3. Vibrators shall not be used to transport concrete in the forms and shall not be used on or against forms or on the reinforcing steel.
4. Except where construction joints are authorized, concrete shall be placed continuously in each section so that each layer will be bonded into the preceding layer both being in a plastic condition. Construction joints shall be made where indicated.
5. Construction joints in walls shall be provided with shear keys in which each member of the key shall have a width of approximately $\frac{1}{3}$ thickness of the wall, the vertical offset being not less than $1\frac{5}{8}$ -inches.

II-7. CONCRETE ON EARTH FOUNDATIONS:

1. Earth foundations upon which concrete is to be placed shall be clean, damp and free from frost, ice and standing or running water.
2. Prior to placing concrete, the earth foundation shall be satisfactorily compacted in accordance with the applicable provisions in Section I - Excavation and Trenching.

II-8. FINISHED FORMED SURFACES:

1. All formed surfaces regardless of location, shall be finished to the extent that all fins and other projections are removed.
2. All exposed formed surfaces shall be rubbed or otherwise finished to the extent that form marks and other surface irregularities are removed.

BUFFALO CREEK PUMPING LINE

II-9. FINISHED UNFORMED SURFACES:

1. All exposed exterior surfaces and all exposed tops of walls shall be given a float finish to produce a surface of uniform texture and appearance unless otherwise specified.

II-10. CURING:

1. Curing of finished concrete shall be done carefully and systematically. All freshly placed and finished concrete shall be cured by keeping concrete continuously wet for a period of seven days. All freshly placed concrete shall be protected from the elements.
2. Use no curing method or process which will discolor exposed concrete surfaces or which will impair bond or penetration of subsequently applied finish.

SECTION III

PLASTIC PIPE

III-1. GENERAL:

1. Thermoplastic water pipe used on this project and referred to hereafter as plastic pipe shall be cast iron pipe size, rigid polyvinyl chloride (PVC) plastic pipe produced by a continuous extrusion process and copper tube size (CTS) polyethylene (PE) pipe service line.
2. The pipe shall be homogeneous throughout, and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform as commercially practical in color.
3. Pipe must be delivered to the job site by means which will adequately support it and not subject it to undue stresses. Pipe ends shall be covered and the cover shall remain in place until the pipe is ready to be coupled.
4. All materials used shall be virgin materials and no scrap material other than clean rework material generated from the manufacturer's own pipe production shall be used.
5. PVC plastic pipe shall be gasketed joint coupled or belled end. PE pipe shall be joined using appropriate brass fittings.
6. Plastic pipe shall be cut with a hand hacksaw or power saw and the ends shall be cut square and smooth. PVC pipe cut ends shall be beveled with care taken to follow the factory bevel angle. Dust and chips resulting from field cuts shall be removed from the interior of the pipe.
7. Contractors may be asked to submit with their proposals the name of the producer of the pipe and fittings, and shall produce upon request any other pertinent information relative to the pipe, for approval by the Engineer. In any event, approval must be obtained before pipe is ordered.

III-2. PVC PIPE:

1. All PVC pipe shall bear the seal of approval of the National Sanitation Foundation (NSF) and meet the requirements of NSF 61. The 18" PVC pipe shall be pressure class 80 psi SDR 51.
2. All gasketed joint coupled pipe shall have both ends tapered for entry into the elastomeric seal couplings or fittings and the ends shall have a ring painted around them to provide a method of checking the depth of socketing after the pipe is coupled. Belled end pipe shall have the plain ends tapered for entry into the O-ring belled couplings or fittings and shall have a ring painted around them to provide a method of checking the depth of socketing after the pipe is coupled. The bells of all belled end pipe shall in no case have

BUFFALO CREEK PUMPING LINE

thinner walls than that of the pipe.

3. All fittings shall be ductile iron mechanical joint fittings conforming to ANS A21.10, 250 psi pressure rating. The fittings shall be furnished with rubber gaskets suitable for cast iron pipe diameters. The fittings shall be furnished with cement lining in accordance with AWWA C104 and have an outside asphaltic coating.
4. Synthetic rubber gaskets shall be installed in all fittings and couplings prior to pipe installation and shall conform to ASTM F477.
5. A lubricant shall be applied to pipe ends to insure smooth and accurate installation of all fittings and couplings. The lubricant shall be furnished and applied in accordance with the pipe manufacturer's recommendations. The lubricant shall be water soluble, nontoxic, unobjectionable in taste and odor imparted to the fluid, nonsupporting of bacteria growth and have no deteriorating effect on the PVC or rubber gaskets.

III-3. CLEANING AND PROTECTING PIPE:

1. The interiors of all pipes and fittings shall be thoroughly swabbed and cleaned of all foreign matter before being installed and shall be kept clean during and after installation.
2. Whenever pipe laying is stopped at the end of the day's work because of rain or for any other reason, the open end of the line shall be sealed with a watertight plug. All water that may have entered the trench shall be removed prior to removing the plug. It is essential that no mud, trench water or other foreign matter be permitted to get into the line at any time.
3. Pipe, fittings, valves and other appurtenances shall be handled in a manner that will insure their installation in the work in a sound and undamaged condition conforming in all respects to specified requirements.

III-4. PIPE LAYING:

1. All PVC pipe shall be installed in accordance with the requirements of AWWA C-605. The pipe, fittings and valves shall be placed in the trench with care. Under no circumstances shall pipe or other material be dropped or dumped into the trench. The pipe shall not be dragged in a manner which would cause scratching of the pipe surface. An excessive amount of scratching on the surface of the pipe will be considered cause for rejection.
2. No pipe shall be laid when trench condition or weather are unsuitable for proper grading, laying or jointing operations.
3. All water service and main lines shall be laid with 36-inches of cover (minimum) over the top of the pipe.

BUFFALO CREEK PUMPING LINE

III-5. THRUST BLOCKING:

1. Thrust blocking shall be required where fittings, including restrained joint fittings, are used to change the direction of the pipeline and at all reducers and caps.
2. Thrust blocks shall be constructed so that the bearing surface is in direct line with the major force created by the fitting. All blocking shall bear against undisturbed earth.
3. Thrust block shall be concrete with a minimum compressive strength of 2000 psi unless otherwise approved by the Engineer.

III-6. PIPE INSPECTION:

1. The Engineer or Owner may reject the pipe for any defects in workmanship such as visible cracks, holes, foreign inclusions, nonuniformity in color, opacity or density and any other defects which, in his opinion, might render the pipe unsuitable for installation in the system.

III-7. TESTING:

1. It is the intent of these specifications that the water lines constructed hereunder shall be and shall remain tight and free from weakness and from leakage under all working and service conditions. All joints that are found, either by observation or test, to leak shall be repaired and made watertight by the Contractor at his own expense.
2. The Contractor shall make pressure and leakage tests as specified herein under the supervision of the Engineer or Owner. The leakage and pressure tests may be performed simultaneously at the Contractor's option. He shall provide all necessary connections between the pipeline or piping and the nearest available source of test water, test pumping equipment, pressure gauge, water meter (leakage test only) and other equipment, materials, and facilities necessary for the required tests. In the event of water not being available at the time of completion of the water lines, the pressure and leakage tests may be delayed until it is available. However, the Contractor shall be required to make the tests as promptly as possible and shall have the sole responsibility for all repairs that may be necessary. The test pressure shall be applied and maintained in each case by means of a hand operated force pump or other suitable device approved by the Engineer.
3. The Contractor will be permitted to make the pressure and leakage tests after the trench is backfilled with the understanding that if the line is not strong and tight, he will be required to uncover it to the extent necessary to find and repair all leaks, all such work being done at this own expense. The line test shall preferably be made in sections using either the sectionalizing valves shown on the drawings to be permanently installed or temporary plugs or valves. All bracing and blocking shall be in place.
4. In making the tests, the section to be tested shall be slowly filled with water. All air shall be expelled from the line by opening all available service valves and vents.

BUFFALO CREEK PUMPING LINE

5. Test pressures shall be applied with a force pump of such design and capacity that the required pressures can be applied and maintained without interruption for the duration of the test. Meters and gauges shall be carefully tested and calibrated as approved by the Engineer or Owner.
6. The test line shall be subjected to a hydrostatic pressure of 150% of the working pressure of the line and as directed by the Engineer for a minimum of four hours. The test pressure on each section shall be specified by the Engineer when notified by the Contractor that a portion of the water line is ready for testing. The Contractor will supply the Engineer with the location of the test pump and any other information requested. Under no circumstances will a section of line be tested without notifying the Engineer in advance.
7. The Engineer or his representative shall be present during the last hour of each pressure test. If the test for any reason fails and repair and retest are necessary, the Contractor shall reimburse the Engineer or his representative at the rate of \$35.00 per hour for all subsequent tests.
8. Leakage Test for PVC Pipe shall be performed using the following equation:

$$L = \frac{SDP^{0.5}}{148,000}$$

where L = allowable leakage, gal./hr.; D = nominal pipe diameter, inches; S = length of pipe tested, feet; P = average test pressure, p.s.i.g. No pipeline or section thereof shall be accepted if the leakage rate disclosed by the test exceeds 10.5 gallons per day per mile per inch of nominal diameter of pipe. The test period shall be conducted for the time as specified above. Replacement water shall be pumped from a container and accurately measured.

9. Leakage Test for Polyethylene (PE) Pipe shall be performed following an expansion phase where the pipeline is gradually pressurized to the test pressure plus 10 psi and maintained at this pressure for three hours while the pipeline undergoes a slight physical expansion. At the end of the expansion phase, the pressure shall be reduced 10 psi and held at the test pressure for a minimum of one hour. If the pressure remains steady (within five (5) percent) during this hour then the pipeline is acceptable.
10. If any pipe, fittings, valves or appurtenances are found defective during the test, they shall be removed and replaced with sound units at the Contractor's expense. The Contractor shall furnish all the necessary appliances and appurtenances for the test and make the test at his own expense.